

IN THE CLAIMS:

Please amend the claims as follows:

1. (Currently Amended) A method for use in a communication network for enabling a signaling node to automatically update routing instructions that are maintained at a network routing node, the method comprising:
 - (a) at a signaling node in an Internet protocol network, generating a routing key registration message, the routing key registration message including SS7 routing key data for updating the status of routing key information associated with the signaling node, the SS7 routing key data including at least one of an originating point code (OPC), a destination point code (DPC), a service indicator (SI), a subsystem number (SSN), and a circuit identification code (CIC);
 - (b) sending the routing key registration message to a network routing node capable of routing messages between the IP network and an SS7 network; and
 - (c) at the network routing node, receiving the routing key registration message and using the SS7 routing key data in the routing key registration message to dynamically update a routing key database entry associated with a connection between the signaling node and the network routing node, wherein using the SS7 routing key data includes extracting the at least one of an OPC, a DPC, an SI, an SSN, and a CIC from the routing key registration message and using the at least one of an OPC, a DPC, an SI, an SSN, and a CIC extracted from the routing key

registration message to update corresponding fields in the routing key database entry.

2. (Original) The method of claim 1 wherein generating a routing key registration message includes generating a transport adapter layer interface (TALI) message.
3. (Original) The method of claim 1 wherein generating a routing key registration message includes generating a stream control transmission protocol (SCTP) message.
4. (Original) The method of claim 1 wherein generating a routing key registration message includes generating an SS7 MTP level two user adaptation layer (M2UA) message.
5. (Currently Amended) The method of claim 1 wherein the SS7 routing key data includes a DPC and wherein using the ~~information~~ SS7 routing key data contained in the routing key registration message to dynamically update a routing key database entry includes using a ~~destination point code (DPC) value~~ the DPC in the routing key registration message to update a DPC in the routing key database entry.
6. (Currently Amended) The method of claim 1 wherein the SS7 routing key data includes an OPC and wherein using ~~information~~ the SS7 routing key data contained in the routing key registration message to dynamically update a routing key database entry includes using a ~~origination point code (OPC) value~~ the OPC in the routing key registration message to update an OPC in the routing key database entry.

7. (Currently Amended) The method of claim 1 wherein the SS7 routing key data includes an SI and wherein using information the SS7 routing key data contained in the routing key registration message to dynamically update a routing key database entry includes using ~~a service indicator (SI) value the SI~~ in the routing key registration message to update an SI in the routing key database entry.
8. (Currently Amended) The method of claim 1 wherein the SS7 routing key data includes a CIC and wherein using information the SS7 routing key data contained in the routing key registration message to dynamically update a routing key database entry includes using ~~a circuit identification code (CIC) value the CIC or a range of CICs~~ in the routing key registration message to update a CIC value or range of CIC values in the routing key database entry.
9. (Currently Amended) The method of claim 1 wherein the SS7 routing key data includes an SSN and wherein using information the SS7 routing key data contained in the routing key registration message to dynamically update a routing key database entry includes using ~~a subsystem number (SSN) value the SSN~~ in the routing key registration message to dynamically update ~~a subsystem number value an SSN~~ in the routing key database entry.
10. (Original) The method of claim 1 wherein sending the routing key registration message includes sending the message over an IP socket.
11. (Currently Amended) A method for routing a signaling message by a network routing node, the method comprising:
 - (a) receiving a signaling message that requires routing;

- (b) using SS7 routing key information contained in the signaling message to search for a match in a first routing key table, the SS7 routing key information including at least one of an originating point code (OPC) and a destination point code (DPC);
- (c) in response to locating a match in the first routing key table, routing the signaling message using routing information returned by the first routing key table;
- (d) in response to failing to locate a match in the first routing key table, using the information contained in the signaling message to search for a match in a second routing key table; and
- (e) in response to locating a match in the second routing key table, routing the signaling message using routing information returned by the second routing key table.

12. (Original) The method of claim 11 wherein receiving a signaling message includes receiving a signaling system 7 (SS7) signaling message.

13. (Original) The method of claim 11 wherein receiving a signaling message includes receiving a transport adapter layer interface (TALI) signaling message.

14. (Original) The method of claim 11 wherein receiving a signaling message includes receiving a stream control transmission protocol (SCTP) signaling message.

15. (Original) The method of claim 11 wherein receiving a signaling message includes receiving a session initiation protocol (SIP) message.

16. (Currently Amended) The method of claim 11 wherein the SS7 routing key information includes a DPC and wherein using information contained in the signaling message the SS7 routing key information to search for a routing key match in the first or the second routing key table includes using a destination point code (DPC) value the DPC.
17. (Currently Amended) The method of claim 11 wherein the SS7 routing key information includes an OPC and wherein using information contained in the signaling message the SS7 routing key to search for a routing key match in the first or the second routing key table includes using a origination point code (OPC) value the OPC.
18. (Currently Amended) The method of claim 11 wherein the SS7 routing key information includes an SI and wherein using information contained in the signaling message the SS7 routing key information to search for a routing key match in the first or the second routing key table includes using a service indicator (SI) value the SI.
19. (Currently Amended) The method of claim 11 wherein the SS7 routing key information includes a CIC and wherein using information contained in the signaling message the SS7 routing key information to search for a routing key match in the first or the second routing key table includes using a circuit identification code (CIC) value the CIC.
20. (Original) The method of claim 11 wherein searching for a match in a first routing key table includes searching for a match in a dynamic routing key table capable

of receiving self-registration messages from IP nodes and automatically updating entries in the dynamic routing key table based on the self-registration messages.

21. (Currently Amended) ~~The method of claim 11~~ A method for routing a signaling message by a network routing node, the method comprising:

- (a) receiving a signaling message that requires routing;
- (b) using information contained in the signaling message to search for a match in a first routing key table;
- (c) in response to locating a match in the first routing key table, routing the signaling message using routing information returned by the first routing key table;
- (d) in response to failing to locate a match in the first routing key table, using the information contained in the signaling message to search for a match in a second routing key table; and
- (e) in response to locating a match in the second routing key table, routing the signaling message using routing information returned by the second routing key table, wherein searching for a match in a second routing key table includes searching for a match in a static routing key table, containing routing key entries that are manually provisioned by an operator through a provisioning interface.

22. (Currently Amended) The method of claim 11 wherein ~~the SS7 routing key information includes an SSN and wherein using information contained in the signaling message the SS7 routing key information to search for a routing key~~

match in the first or the second routing key table includes using a ~~subsystem~~ number (SSN) value the SSN.

23. (Currently Amended) A method for performing reliable call signaling communications over an Internet protocol (IP) network using dynamic routing key registration, the method comprising:
 - (a) establishing a first IP connection between a signaling gateway and an IP node;
 - (b) establishing a second IP connection between the signaling gateway and the first IP node
 - (c) sending call signaling messages between the signaling gateway and the first IP node over the first IP connection; and
 - (d) in response to failure of the first IP connection, sending a routing key registration message from the first IP node to the signaling gateway over the second IP connection, the routing key registration message including at least one SS7 routing key for dynamically diverting signaling messages originally destined to be sent over the first IP connection to the second IP connection.
24. (Currently Amended) The method of claim 23 comprising establishing a third IP connection between the signaling gateway and a second IP node, and in response to detecting failure of the first IP node, sending a second routing key registration message from the second IP node to the signaling gateway, the second routing key registration message including at least one SS7 routing key

for dynamically diverting traffic originally destined for the first IP node to the second IP node.

25. (Original) The method of claim 23 wherein the first IP node comprises a media gateway controller.
26. (Original) The method of claim 23 wherein the first and second IP nodes each comprise media gateway controllers.
27. (Original) The method of claim 23 wherein the first IP node comprises a service control point.
28. (Original) The method of claim 23 wherein the first and second IP nodes each comprise a service control point.
29. (Currently Amended) A communication system that is adapted to enable a signaling node to automatically provide routing instructions to a signaling message routing node, the system comprising:
 - (a) a signaling node ~~that is~~ adapted to generate and send a routing key registration message that contains SS7 routing key ~~instructions information~~ associated with the signaling node, the SS7 routing key ~~instructions information~~ including at least one SS7 message routing parameter to be examined in incoming call signaling messages for directing the call signaling messages to the signaling node of an originating point code (OPC), a destination point code (DPC), a service indicator (SI), a subsystem number (SSN), and a circuit identification code (CIC); and

(b) a signaling message routing node that is including a routing key database,
the signaling message routing node being adapted to receive the routing
key registration message and to dynamically update [[a]] an entry in the
routing key database [[entry]] based on the SS7 routing key instructions
information, wherein the signaling message routing node is adapted to
extract the at least one of an OPC, a DPC, an SI, an SSN, and a CIC from
the routing key registration message and to update corresponding fields in
the routing key database entry.

30. (Currently Amended) The system of claim 29 wherein the signaling node [[is]]
comprises a media gateway controller (MGC) [[node]].

31. (Currently Amended) The system of claim 29 wherein the signaling node [[is]]
comprises a service control point (SCP) [[node]].

32. (Currently Amended) The system of claim 29 wherein the signaling node [[is]]
comprises a database server [[node]].

33. (Currently Amended) The system of claim 29 wherein the routing key registration
message [[is]] comprises a transport adapter layer interface (TALI) message.

34. (Currently Amended) The system of claim 29 wherein the routing key registration
message [[is]] comprises a stream control transmission protocol (SCTP)
message.

35. (Currently Amended) The system of claim 29 wherein the SS7 routing key
instructions associated with the signaling node include information includes
destination point code (DPC) value DPC.

36. (Currently Amended) The system of claim 29 wherein the SS7 routing key ~~instructions associated with the signaling node include~~ information includes an origination point code (OPC) value OPC.
37. (Currently Amended) The system of claim 29 wherein the SS7 routing key ~~instructions associated with the signaling node include~~ information includes a service indicator (SI) value an SI.
38. (Currently Amended) The system of claim 29 wherein the SS7 routing key ~~instructions associated with the signaling node include~~ information includes a circuit identification code (CIC) value CIC.
39. (Currently Amended) The system for claim 29 wherein the SS7 routing key ~~instructions associated with the signaling node include~~ information includes a subsystem number (SSN) value an SSN.
40. (Currently Amended) The system of claim 29 wherein the signaling message routing node [[is]] comprises an SS7-to-IP gateway routing node.
41. (Currently Amended) The system of claim 29 wherein the routing key database includes a dynamic routing key table having entries that are dynamically updated based on routing key registration messages received from IP nodes and a static routing key table having entries that are manually provisioned and that are not dynamically updated based on the routing key registration messages.
42. (Currently Amended) The system of claim 29 wherein the routing key database includes a single routing key table that includes both dynamic routing key data and static routing key data, the dynamic routing key data being dynamically updated based on received routing key registration messages and the static

routing key data that is manually provisioned and that is not updated based on the routing key registration messages.

43. (Currently Amended) The system of claim 42 wherein the dynamic routing key data and the static routing key data components of the routing key table are each binary tree (b-tree) indexed.
44. (Currently Amended) A network routing node that is adapted to receive routing key registration information from an associated signaling node and subsequently use the routing key registration information to update a routing database, the network routing node comprising:
 - (a) a communication module adapted to receive a routing key registration message from an IP node in an IP network, the routing key registration message including [[data]] SS7 routing key information for dynamically updating a routing key entry associated with a connection between the communication module and the IP node, the SS7 routing key information including at least one of an originating point code (OPC), a destination point code (DPC), a service indicator (SI), a subsystem number (SSN), and a circuit identification code (CIC); and
 - (b) a dynamic routing key [[table]] registration process and a dynamic routing key registration table, the dynamic routing key registration process being adapted to dynamically update SS7 message routing data for a dynamic routing key table entry associated with the connection based on the SS7 routing key information contained in the routing key registration message.
45. (Canceled)

46. (Currently Amended) ~~The network routing node of claim 44 including A network routing node that is adapted to receive routing key registration information from an associated signaling node and subsequently use the routing key registration information to update a routing database, the network routing node comprising:~~

- (a) a communication module adapted to receive a routing key registration message from an IP node in an IP network, the routing key registration message including data for dynamically updating a routing key entry associated with a connection between the communication module and the IP node;
- (b) a dynamic routing key table adapted to dynamically update SS7 message routing data for a routing key table entry associated with the connection based on the information contained in the routing key registration message;
- (c) a static routing key table containing static routing key information that is not updated with the routing information contained in the routing key registration message; and
- (d) a manager process for controlling the sequence in which the dynamic and static routing key tables are searched during a routing operation.

47. (Currently Amended) The network routing node of claim 44 wherein the communication module [[is]] comprises a self-registration data communication module (sDCM).

48. (Currently Amended) The network routing node of claim 44 wherein the routing key registration message [[is]] comprises a transport adapter layer interface (TALI) message.
49. (Currently Amended) The network routing node of claim 44 wherein the routing key registration message [[is]] comprises a stream control transmission protocol message.
50. (Currently Amended) The network routing node of claim 44 wherein the SS7 message routing key information [[data]] includes a ~~destination point code (DPC) value DPC~~.
51. (Currently Amended) The network routing node of claim 44 wherein the SS7 message routing key information [[data]] includes an ~~origination point code (OPC) value OPC~~.
52. (Currently Amended) The network routing node of claim 44 wherein the SS7 message routing key information [[data]] includes a ~~service indicator (SI) value an SI~~.
53. (Currently Amended) The network routing node of claim 44 wherein the SS7 message routing key information [[data]] includes a ~~circuit identification code (CIC) CIC~~.
54. (Currently Amended) A self-registration data communication module for receiving dynamic routing key registration requests from signaling nodes in an Internet protocol (IP) network and for dynamically updating a routing key table based on the routing key registration requests, the self-registration data communication module comprising:

- (a) ~~a TCP/IP sockets~~ an interface for receiving routing key registration request messages from one or more signaling nodes in an IP network, each routing key registration request message including at least one of an originating point code (OPC), a destination point code (DPC), a service indicator (SI), a subsystem number (SSN), and a circuit identification code (CIC);
- (b) a dynamic routing key table for storing SS7 routing key information for routing SS7 signaling messages to the signaling nodes in the IP network based on corresponding routing key parameters in the signaling messages, the SS7 routing key information including the at least one of an OPC, a DPC, an SI, an SSN, and a CIC extracted from one of the routing key registration messages; and
- (c) dynamic routing key registration process for dynamically updating the routing key information in the routing key database in response to the routing key registration requests.

55. (Currently Amended) The self-registration data communication module of claim 54 wherein the ~~TCP/IP sockets~~ interface is adapted to receive routing key registration request messages from a media gateway controller (MGC).

56. (Currently Amended) The self-registration data communication module of claim 55 wherein the ~~TCP/IP sockets~~ interface is adapted to receive routing key registration request messages from a service control point (SCP).

57. (Original) The self-registration data communication module of claim 55 wherein the dynamic routing key table maps the SS7-based routing keys to TCP/IP socket associations for the signaling nodes in the IP network.
58. (New) The method of claim 1 wherein the routing key registration message includes a flag for indicating whether the routing key data in the routing key registration message is intended to override an existing association in the routing key database, and wherein the method further comprises, in response to determining that the SS7 routing key information is intended to override the existing association, replacing the routing key data in the routing key database entry with the routing key data in the routing key registration message.
59. (New) The method of claim 58 comprising, in response to determining that the routing key registration data in the routing key registration message is not intended to override the existing association, adding an entry to the routing key registration database corresponding to the routing key data contained in the routing key registration message.
60. (New) The method of claim 1 comprising maintaining a static routing key database at the network routing node, the static routing key database including entries that are manually provisioned by a network operator.
61. (New) The system of claim 29 wherein the routing key registration message includes a flag for indicating whether the routing key information in the routing key registration message is intended to override an existing association in the routing key database, and wherein, in response to determining that the SS7 routing key information is intended to override the existing association, the

signaling message routing node is adapted to replace the routing key information in the routing key database entry with the routing key information in the routing key registration message.

62. (New) The system of claim 61 wherein, in response to determining that the routing key registration information in the routing key registration message is not intended to override the existing association, the signaling message routing node is adapted to add an entry to the routing key registration database corresponding to the information contained in the routing key registration message.
63. (New) The system of claim 29 wherein the signaling message routing node comprises a static routing key database node, the static routing key database including entries that are manually provisioned by a network operator.
64. (New) The network routing node of claim 44 wherein the routing key registration message includes a flag for indicating whether the SS7 routing key information in the routing key registration message is intended to override an existing association in the dynamic routing key registration table, and wherein, in response to determining that the SS7 routing key information is intended to override the existing association, the dynamic routing key registration process is adapted to replace the routing key information in the dynamic routing key table entry with the SS7 routing key information in the routing key registration message.
65. (New) The network routing node of claim 64 wherein, in response to determining that the routing key registration information in the routing key registration message is not intended to override the existing association, the dynamic routing

key registration process is adapted to add an entry to the routing key registration database corresponding to the SS7 routing key information contained in the routing key registration message.

66. (New) The network routing node of claim 44 comprising a static routing key table including entries that are manually provisioned by a network operator.
67. (New) The self-registration data communication module of claim 54 wherein the routing key registration message includes a flag for indicating whether the routing key information in the routing key registration message is intended to override an existing association, and wherein, in response to determining that the SS7 routing key information is intended to override the existing association, the dynamic routing key registration process is adapted to replace the routing key information in the routing key database entry with the routing key information in the routing key registration message.
68. (New) The self-registration data communications module of claim 63, wherein in response to determining that the routing key registration information in the routing key registration message is not intended to override the existing association, the dynamic routing key registration process is adapted to add an entry to the routing key registration database corresponding to the information contained in the routing key registration message.
69. (New) The self-registration data communications module of claim 54 comprising a static routing key database including entries that are manually provisioned by a network operator.